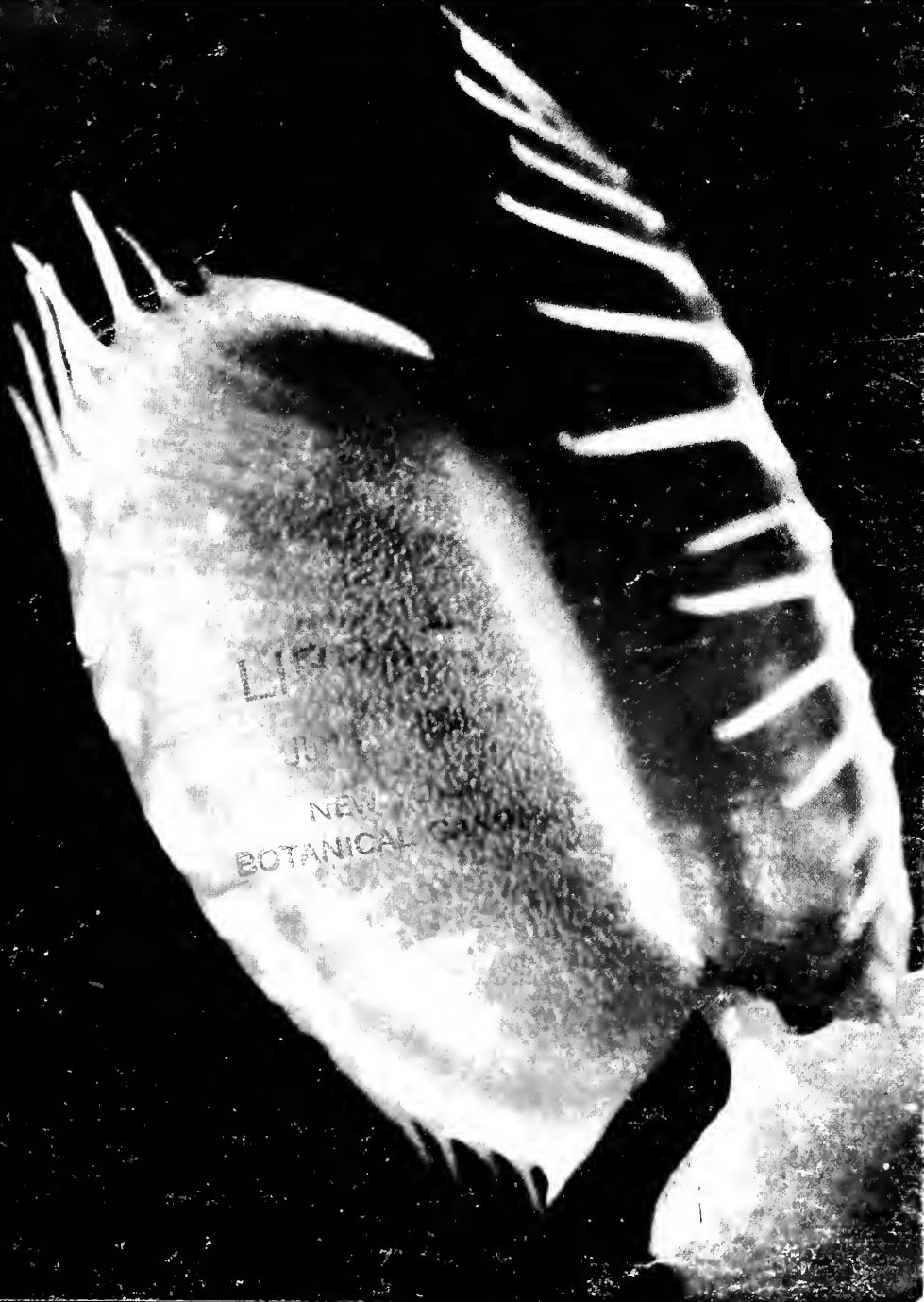


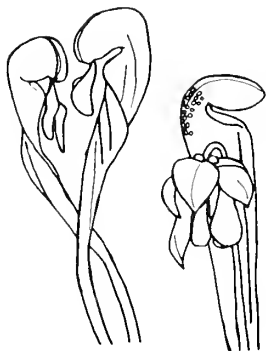
XC
A704
19
14

CARNIVOROUS PLANT NEWSLETTER

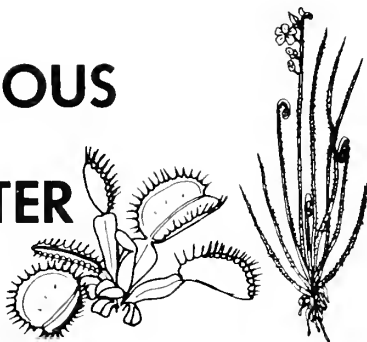
VOLUME 9, Number 4

DECEMBER 1980





CARNIVOROUS PLANT NEWSLETTER



Volume 9, Number 4
December 1980

COVER

We are continuing to feature *Dionaea*. The Venus' flytrap captures insects in its bear-trap-shaped leaves. Insects are reported to be attracted to glands in the region around the edge of the inner part of the leaf. If they chance to touch one of the three trigger hairs on either lobe of the trap only once during their movements, there is no response, but if the insect should be so unfortunate as to brush against the same hair or any of the other hairs a second time the trap snaps shut, incarcerating him. Note that the inner surface of the trap is convex and the outer surface is concave when the trap is open. Closure occurs when the lobes of the trap flip shut so that this situation is reversed. After closure the inner surface is concave and the outer surface is convex. Thus, the movement occurs in the lobes and not at a "hinge" between them as is sometimes erroneously stated. See continuation of Stephen Williams' article on page 91. Photo and caption by S. Williams.

The co-editors of CPN would like everyone to pay particular attention to the following policies regarding your subscription to CPN:

All correspondence regarding subscriptions, address changes and missing issues should be sent to Mrs. Kathy Fine, c/o The Fullerton Arboretum, California State University, Fullerton, CA 92634. **DO NOT SEND TO THE CO-EDITORS.** Checks for subscriptions and reprints should be made payable to CSUF FOUNDATION-ARBORETUM.

All material for publication, comments and general correspondence about your plants, field trips or special noteworthy events relating to CP should be directed to one of the co-editors. We are interested in all news related to carnivorous plants and rely on the membership to supply us with this information so that we can share it with others.

Views expressed in this publication are those of the authors, not necessarily the editorial staff.

Copy deadline for the March issue is February 1, 1981.

CO-EDITORS:

D. E. Schnell, Rt. 4, Box 275B, Statesville, NC 28677

J. A. Mazrimas, 329 Helen Way, Livermore, CA 94550

T. L. Mellichamp, Dept. of Biology, UNCC, Charlotte, NC 28223

Leo Song, Dept. of Biology, California State University, Fullerton, CA 92634

SECRETARY-TREASURER: Mrs. Kathy Fine, c/o The Fullerton Arboretum

PUBLISHER: The International Carnivorous Plant Society by The Fullerton Arboretum, California State University, Fullerton, CA 92634. Published quarterly with one volume annually. Printer: Kandid Litho, 129 Agostino Rd., San Gabriel, CA 91776. Circulation: 910 (282 new, 628 renewal). Subscriptions: \$10 annually, \$15 foreign. Reprints available by volume only.

© 1980 Carnivorous Plant Newsletter. All rights reserved.

Editor's Corner

WHAT IS OUR SOCIETY ABOUT?

by Larry Mellichamp

Starting in 1981 we will be known as the International Carnivorous Plant Society (ICPS). Instead of being merely "subscribers" to CPN, you will become "members" of ICPS, with a subscription to CPN as a benefit of this membership.

I hope that all of our present subscribers will consider becoming members of ICPS. Basically the only things that will change will be that (1) the Society will have a formal name, with CPN as its official publication; (2) a formal set of by-laws will be presented to and voted on by the membership to help govern the activities of the society; (3) officers will be elected from among the membership to help improve the operations and the image of the Society; and (4) regularly scheduled meetings will be planned to help increase communications among the membership. We, the co-editors, feel that these changes will be very beneficial.

There will be many advantages to belonging to the Society. First, we hope that no one will avoid the Society because they think the new name implies that the members are more experienced or more knowledgeable. This is certainly not our purpose. We want everyone, especially beginners, to belong to the Society and feel that they have just as much voice and value as they had before. The fundamental purpose of the Society, as it has always been, is to facilitate the exchange of views and experiences. Do not be scared by the concept of a "society"; the society name is somewhat of a formality that helps with the technicalities of bookkeeping and other legalities that we seem to be getting more involved in as a result of becoming incorporated.

More importantly, the new Society name will give us a long-needed image boost and allow us to attain a level of international recognition that we did not have before. For example, when popular plant magazines prepared their surveys of currently operating plant societies, we would be left out *simply* because we didn't have the word "Society" in our name. We were there, and we did all the important things that any other society did, but we were essentially invisible to some people. The new name should be looked upon as an increase in prestige and we all should be proud to belong.

A more tangible benefit of membership will be the continuation of your subscription to the Carnivorous Plant Newsletter, begun in 1972 and getting better all the time. This is a unique publication because it contains articles dealing with a broad range of topics: from "how-to" articles on propagation and growing techniques, to discussions of historical aspects of CP, their native habitats, descriptions of new species, compilations of data on various color forms and hybrids, and more technical articles and literature reviews with many aspects of the biology of CP. In addition, CPN is a means of expressing your own personal views, your own experiences, of asking directly for advice, and for submitting articles dealing with your own work with CP. It is equally open to the beginner and the experienced researcher, and I must say that we had a very good balance of material over the past few years. We need to maintain this quality and encourage everyone to submit questions, notes, observations, or research for publication. CPN is now found in many popular and academic libraries around the world; it is listed in several scientific indexes; many people, both laymen and scientists are aware of its existence and its value. By becoming a member of the Society you will contribute to the perpetuation and improvement of a newsletter which disseminates information to many people. The scientific value of CPN is now unquestioned, and it is more valuable than the publications of some other societies. As we continue, we will improve our reputation even more. Your support is needed. CPN is something that you should feel like keeping all your copies forever. A complete set of CPN will increase in value over the years. I am

proud to have been a charter subscriber, and my early issues of CPN are bound together in permanent book-form. I refer to them often.

There are other benefits to membership. The seed bank has been a great success. It has distributed seed to many people that would otherwise have been unable to obtain them. Many of the seeds are of rare plants, some are threatened with extinction in nature and should be grown in cultivation so that we may know more about them. This is a valuable service that everyone who grows CP can perform: making observations that may someday make the difference in the survival of a plant, or discovering a use that may be of great benefit to mankind. The carnivorous plants are a very unusual group of plants anyway, and this is part of their wide appeal. The fact that they are easily grown in cultivation means that many people will have access to them. This Society can be the main coordination body to help with this facet to working with CP. In the ICPS everyone will have access to the seed bank and want ads and we hope that many people will contribute accurately labeled seed to help spread the rewards of growing CP to more people.

Members of the ICPS will also have access to any special publications prepared by the Society. There are several in the making, some that would not be possible without the backing of a society.

Thus, we have seen that there are many reasons for belonging to ICPS. There are personal rewards. There is the reward of receiving accurate, up-to-date information on new developments on the world of CP. There is the reward of knowing that you are supporting scientific work, and helping to disseminate information to the public. There is the reward of having a publication containing information useful to your interest in growing CP, and containing information that broadens your general background knowledge about CP all over the world. You have access to seeds and plants. Membership in the ICPS will help you gain access to special collections and workers at Universities and Botanical Gardens through the use of your Membership Card. And there is the reward of belonging to an organization of so many fine people with similar interests in a unique group of plants, where information can be freely transferred.

You have been successful in supporting CPN thus far, and we appreciate it. We hope the benefits to you have been great. We are now asking you to keep up the support as we move into the next phase of our evolution, and help us with the growing pains associated with becoming a full-fledged Society. Your comments and suggestions are always welcome—write to any of the four co-editors and your views will be considered.

CPN SEED BANK

No Seed Bank this issue due to low inventory. Please send in your donations of seed to:

CPN Seed Bank; c/o Patrick Dwyer; St. Michael's Episcopal Church; 49 Killean Park; Albany, NY 12205; USA. See March issue for instructions.

News and Views

MIR ALI [480 Lawson Rd., London, Ontario, Canada NGG-1X8] reports that he had an experience of seeing some seed of a *Utricularia* (aquatic-type) fall into a pitcher of *Sarracenia purpurea venosa* and germinate. The *Utricularia* seemed to grow in the pitcher unaffected by the enzymes of the digestive fluid. The *Utricularia* is in excellent condition and produces maximum sized bladders.

In volume 9 of CPN, pg. 7, there is an article cautioning us not to use Miracid on aquatic *Utricularia*. Mir found that Miracid works quite well if ¼ teaspoon per liter of water is used about once every six months.

BILL CARROLL [Rt. 5, 202 Ridge-wood, Chapel Hill, NC 27514] grew some *Pinguicula lutea* from a random sample of CPN Seed Bank seed that had a peculiar flower color variation. They were a green-yellow or chartreuse color. The plant grew three flowers, but unfortunately died before seed could be obtained. The accompanying photo shows one of these flower color variants alongside a typical yellow *P. lutea*. Bill and we at CPN would be interested in hearing from others who have seen flower color variation in *Pinguicula*s, particularly in plants from CPN Seed Bank seed. (See also CPN 9:49 for a review of a paper by Schnell on white flowered variants of *P. caerulea*.)

WILLIAM J CLEMENS [7410 Lime St. Apt. E, La Mesa, CA 92041] writes: My water here in Southern California has a ppm count of about 550 ppm with a fairly high concentration of chlorine gas. To circumvent this problem I have set up my own method/system for purification. First, I rented a R. O.* unit from Culligan at \$12 per month. This unit takes my water down to a ppm count of about 30 ppm and with a total monthly output of about 225 gallons costs approximately 5.3¢ per gal. This unit drains into a 32 gal. plastic

holding tank which for use is pumped through a 2400 grain capacity mixed bed D.I.* tank. Output is usually either into my greenhouse PVC overhead misting system and/or through a misting nozzle on the end of a special plastic tubing used in lieu of regular garden hose which I find gives the pure water a strange smell and taste. All in all the cost for the first 1300 gallons amounts to a little less than .20¢ per gallon and with my normal water use pays for itself in about 2-3 months. The improvement in plant growth and health is remarkable and I expect an even greater percent improvement to be noticed as soon as the active growing season starts this spring.

* Reverse Osmosis, De-ionization

If anyone would like more information than is included in this letter they may write me and I will be glad to supply all the information I can.

DANA CRAIG [67 Hill St., Norwood, MA 02062] is seeking a good clean copy for purchase of Swenson, CULTIVATING CARNIVOROUS PLANTS (now out of print). Anyone wishing to sell a copy can contact her directly. She also suggests that a page/figure number indexed mimeo list of Latin names for plants pictured in Japanese books where the Latin name is not indicated would be helpful in the case of each publication. This would be a good project for an enterprising ICPS member who is able to translate Japanese! Finally, she reports on a course offered by the Massachusetts Horticultural Society on June 10th entitled, "Carnivorous Plants to Know and Grow", and conducted by Jorie Hunken of Garden in the Woods. Emphasis was on proper horticultural techniques as well as preservation in native habitats.

JEFF GROTHAUS [1265 Iliff Ave., Cincinnati, Ohio 45205] writes: For

readers in the Cincinnati area, the Krohn Conservatory in Eden Park has an excellent terrarium planting of CP, including: *Dionaea*, *Sarracenia*, *Drosera* and *Pinguicula*. This is true at least as of this writing, Aug. 1980.

In the "Review of Recent Literature" column in CPN Dec. 1979 an incomplete reference is given to an article in *Smithsonian Magazine*. The reference is to *Smithsonian* Vol. 10, No. 5, pgs 91-94 (Aug. 1979).

I have been using sodium biphosphate, found in aquarium pH test kits, this year to adjust the acidity of water for my CP. I wonder if anyone has any comments on the advisability of this; so far, I have not seen any negative effects.

Probably every reader of CPN (except those fortunate enough to own or have access to a greenhouse) has, as have I, wrestled with plastic film for this purpose and am pleased with the results. This is a cheap, easy, neat looking alternative with which an enclosure can be constructed for nearly any sized plant. The plastic that I am using is "type D mylar" between 5 and 10 mil thick. The "type" designation refers to the clearness of the film, type D being clear. The thickness is unimportant as long as the film is flexible enough to be formed as needed and rigid enough not to collapse. A cylinder can be made to fit snugly inside the pot in which the plant is growing; the top can be left open or covered with any of a variety of materials: mylar, plastic food wrap, plastic bag, flower pot, plastic water dish for under pots... Clear plastic tape is a good way to hold the mylar together; if the plant is repotted the tape can be cut or removed and the mylar reused. If the plant outgrows the cover simply add an extension.

Early this summer I constructed a small outdoor bog, 4' in diameter by 1' deep and lined with 3 layers of plastic film. The planting medium is "dried long fiber" sphagnum moss topped with live sphagnum. This was purchased from the Mosser Lee Co. of Millston, Wis. at a very reasonable price: approximately 4 cu. ft. of dried long fiber moss @ \$9.00 and

approximately 2 bu of live moss @ \$7.65—both prices include UPS shipping to Cincinnati. (At first the live moss did not appear to be very much alive but it eventually began to green up and grow.) On July 7th, I planted several specimens each of: *Dionaea*, *Sarracenia purpurea venosa*, *S. minor*, *S. flava*, *S. rubra* and *S. leucophylla*. So far, the flytraps are doing very well and all of the pitcher plants are producing pitchers, a few of which are beginning to mature. More recently I have introduced a *Drosera binata* plant and several *D. intermedia* seedlings and plan to introduce *D. rotundifolia* and *D. x californica*. Additionally, I plan to sow seeds of North American CP and allow them to stratify in the bog this winter. Next spring should be interesting.

RON JENNINGS [635-D Chelsea Place; Newport News, VA 23603] writes: My sundew adventure began around two years ago when I received my first *D. capensis* plant. I ordered both the wide and narrow leaf varieties which I planted in sphagnum peat and watered with distilled water. I was more successful with using rain water since in my area the pH is acid (pH 6.2) and even my other CP improved.

My terrarium soon was full of these plants since they reproduced from self-pollination of the flowers. So I dug some of them up and planted them behind a friend's house, in a small sphagnum bog where we had been growing successfully *Dionaea*, *S. purpurea*, *S. flava*, *S. minor* and *Drosera binata*. Now I knew that these plants couldn't survive sub-freezing weather so I didn't expect to see any of them next year.

To my surprise, the terrarium plants I dug up came back from the roots. I even had more plants than originally. These matured and produced seeds in a very short time and now I have a few hundred. It appears that the more one cuts up the roots, the more plants one gets.

Now, what do you suppose happened to the outside plants? They grew back this summer and I suspect that the deep roots (Please see **NEWS & VIEWS** p. 101)

HOW VENUS' FLYTRAPS CATCH SPIDERS AND ANTS

By Stephen E. Williams

(Continued from September)

How does a trap move? Most authors, myself included, have preferred to think of this very rapid movement as being due to a rapid loss of water from various cells in the trap. Ashida proposed a model of trap movement based on this idea which is very attractive. He proposed that a loss of water from the cells on the inner surface of the leaf would allow cells on the outer surface of the leaf to expand and the lobes would then curve inward. Unfortunately there is no evidence that his ideas are correct and evidence from experiments by Brown [Table II] indicate that this is not likely to be the case. Although it is based on an inadequate number of samples and the methods are a bit crude, Brown's experiments indicate that closure results from a very rapid growth of the cells on the outer surface of the trap. A sudden release of a factor that causes the cell walls of this surface to loosen is not out of the question, while a reopening process due to

growth is quite reasonable. Our laboratory is presently working on this problem—the answer to which may have importance to understanding the nature of plant growth in general. Presently, however, the best answer to the question of how a *Dionaea* trap moves is: "It is not known".

We are left with a picture of an ant or spider walking inadvertently into a trap, tripping two hairs at an interval of a few seconds and finding itself trapped in a pocket with the triggerhairs. It stimulates these as it struggles and thereby tightens the trap around itself and initiates the secretion of digestive fluid which kills it. As the digestive fluids decompose the prey, salts and amino acids are released. These stimulate the trap to remain closed and perhaps also stimulate more secretion. When no more breakdown products exist to stimulate trap closure it reopens. When all of these actions are put together we see behavior which is as complex as that of some primitive animals. I cast my vote with Darwin, *Dionaea* is "the most wonderful plant in the world."

TABLE II. PERCENT INCREASE IN LENGTH OF ABAXIAL AND ADAXIAL SIDES OF *DIONAEA* TRAP LOBES DURING CLOSURE AND RECOVERY VERSUS THE INCREASE IN LENGTH OF UNSTIMULATED CONTROLS. ^a

<i>DIONAEA</i>			
	ABAXIAL		ADAXIAL
CLOSING	8.4	(5) ^b	-1.0 (2)
RECOVERY	0.8	(3)	9.4 (2)
GROWTH OF CONTROL DURING ½ DAY	0.5	(3)	

^a Data from W.H. Brown, Amer. J. Bot. 3,69-90 (1916).

^b The number of replications is given in parenthesis.

References: Except for the original data presented in Table I the author and others have reviewed these subjects in the following articles, each of which gives complete references.

Burdon-Sanderson, J.S. and Page, J.F.M., 1876. On the mechanical effects and on the electrical disturbance consequent on the excitation of the leaf of *Dionaea muscipula*. Proc. R. Soc. 25:411-434.

Lichtner, F.T. and Williams, S.E., 1977. Prey capture and factors controlling (Please see WILLIAMS p. 100)

CP GROWING IN CENTRAL FLORIDA

By Cliff Dodd II
2225 S. Atlantic Ave.
Daytona Beach Shores, FL 32018

My interest in plants started some ten years ago when a *Philodendron* was left in my care. Gradually a small collection of houseplants was formed by visiting local nurseries and department stores and it was in one such store I saw my first CP, a small *Dionaea*. Having a taste for the exotic and a general curiosity about this odd plant I had seen only in pictures, I took one home. Although the plant thrived for a while, it gradually began to sicken and finally died. This prompted a little research into the culture of the Fly-Trap and as a by-product uncovered many other species of CP as well.

Being somewhat discouraged with growing *Dionaea* I ordered several of the smaller *Sarracenia* from a biological supply co. and planted them in a small terrarium. Most of the plants lived only a few months, but two *S. purpurea* soon filled in the bare spots by covering the planter. They grew well for over two years, with one plant producing a side shoot, but eventually they died from not having the dormancy period they require. At the time I did not realize that simply placing them outside during our winter months would have kept them growing year after year, and after losing these plants for no obvious reason, I was about ready to give up. [Can't place them outside abruptly without accomodation, or freeze will kill them.]

Then during a trip to Sarasota, FLa., I stopped for a visit at Marie Selby Botanical Gardens, where I saw my first *Nepenthes*, *N. sanguinea*, growing out of a lava-rock wall in company with orchids and other epiphytes. After two more visits, one of the workers asked the owner of the plant if I might have a cutting, to which he agreed. Upon reaching home, the cutting was potted in a mixture of coarse peat and sand and placed pot and all in a clear plastic bag. After four weeks the bottom of the cutting began to rot, so it was cut above the diseased area and repotted in

fresh soil. Finally after three months a new leaf appeared and the plant was on its way. *N. sanguinea* was supposed to be somewhat of a difficult plant to grow, and since it was still doing well after several months, it was time to look for other members of the genus.

On a trip to Oahu, a visit to Foster Gardens turned up several more species of *Nepenthes*, but they were not in the best shape, the Garden's prime concern being their fine collection of palms. While they could not sell any of the plants, they did recommend a nursery I might try, where I found a specimen of *N. mirabilis*. It had no pitchers, and no one seemed to know what they would look like, but it was a large plant so I took a chance. In order to be carried back to the Mainland all of the soil [and most of the roots] had to be removed. Due to shock, it was several months before the plant recovered and began producing its long green pitchers. (See Figs. 1 & 2, p. 93)

Gradually, through mail order and subsequent trips, several more species were turned up, among them; *N. alata*, *N. kampo-tiana*, *N. rafflesiana*, *N. x 'Superba'*, and even two small *N. villosa*, plus several tropical *Drosera* spp. There was now no turning back. I have even tried my hand at *Sarracenia* again [they have finally stopped dying and are doing well] and have found well populations of *S. minor* and *Drosera capillaris* in the west part of our county. (See Figs. 3 & 4, p. 93)

Growing CP in central Fla. does have its unique compensations. There is usually plenty of rain-water available for those species that prefer it, and the humidity during the warm months runs 85-99%. All my *Nepenthes*, *Cephalotus*, and the tropical *Drosera* are kept in a greenhouse that doubles as a shade house in summer [several side panels lifting to provide ventilation and let out excess heat]. In winter where night-time temperatures may fall into the

(Please see **FLORIDA** p. 97)



FIG. 1 *N. sanguinea* and *N. alata* (latter being held)



FIG. 2 *N. mirabilis*

CP growing in central Florida
Photos by C. Dodd II



FIG. 3 *N. alata* -Green form



FIG. 4 *S. minor* in flower

Growing CP Under Lights

By Jim Miller
2319 Ninth St.
Green Bay, WI 54304

A lot of enthusiasts seem to be growing carnivorous plants under artificial light these days, but surprisingly little has been written in these pages regarding this method of cultivation. Considering the nastiness of our Wisconsin winters, it seemed only logical to grow many of the tropical or sub-tropical species indoors where conditions may be more easily and less expensively controlled.

Prior to my move to these more northerly climes, I grew only two species indoors in Tallahassee, Florida year-round. These were *Drosera schizandra* and *D. adelae*. All other species seemed to prosper in culture outdoors in my greenhouse. But with the prospect of temperatures of twenty degrees below zero [F.] and possibly even lower, it seemed wise to gain as much knowledge as possible concerning artificial light cultivation. But, as mentioned, very little information was found on the subject. So it was mostly a matter of simple trial and error.

Now, after better than a year, I can certainly recommend this method of growing to others. Some of the plants growing in my indoor growing area are truly prospering, especially the Mexican *Pinguicula* species and *Darlingtonia californica*. For the most part, plants are from 25 to 40cm away from the lights depending on the pot depths. My growing area is located in my basement and began with two simple shop lights hung over a table made of spare lumber. The lights were equipped with two Grow Lux and two cool white 4 foot fluorescent tubes. This set-up has evolved to a nearly room-sized area with six banks of lights and more to be added soon.

Temperatures reach an average of 50-55 during the winter months and typically are in the seventies during the summer. Humidity runs between 40 and 60% and this is supplemented where necessary with a light misting twice a day. In these condi-

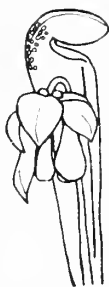
tions, most carnivorous plants may be grown in rather drier conditions than we usually associate with successful cultivation. The main problem lies in the area of fungus infections which seem to thrive in cool, overly-damp soils. Therefore care must be taken in maintaining a just-damp growing medium. I seem to have a bit of success in controlling the various fungus attacks by using vermiculite in my soil mixes as it tends to keep a more open, well-drained soil structure and is effectively a rather sterile medium in itself. It seems particularly suitable for *Pinguicula* species.

Generally, under my conditions, I need to water less than once a week. I use distilled water for this as it helps keep conditions more closely controlled and will not kill live sphagnum. Generally I use two gallons or less a week including the water used for misting. I pour a small amount of water into the trays the plants are growing in so that there is only a small amount around the base of each pot to be taken in by capillary action. This may be supplemented with some syringing of individual pots needing more water. I think most readers would be surprised at how dry most of the soils get between watering yet even such species as *Darlingtonia*, which in natural habitats thrives on water, seem to respond incredibly well to these decreased moisture levels.

The key seems to be the relatively cool temperatures and high humidity provided naturally in the basement and by misting. All *Drosera* species constantly display heavily dewed tentacles and while the leaves do not seem to be as large as on outdoor grown plants, the indoor plants seem to maintain a higher number of active leaves.

As for light levels, I do not supplement my lights with reflectors at all yet most plants color-up very well including *Dionaea*. My experience is that the cooler the tempera-

(Please see **GROWING CP** p. 97)



CARNIVOROUS PLANT NEWSLETTER



INTERNATIONAL CARNIVOROUS PLANT SOCIETY (ICPS) INFORMATION

(Official Journal
of the ICPS)

CO-EDITORS:

D.E. Schnell
Rt. 4, Box 275B
Statesville, NC 28677

T.L. Mellichamp
Biology Dept., UNCC
Charlotte, NC 28223

J.A. Mazrimas
329 Helen Way
Livermore, CA 94550

Leo Song
Biology Dept., CSUF
Fullerton, CA 92634

CARNIVOROUS PLANT NEWSLETTER (CPN) is the official journal of the International Insectivorous Plant Society (ICPS) and is published quarterly. CPN is dedicated to bringing communication among people interested in carnivorous plants (CP)—be they amateur naturalists or professional botanists. Each color-cover, six-by-nine inch booklet contains at least 24 inside pages with about 15,000 words or more along with occasional color plates, black and white illustrations, drawings and other illustrative material. Most of the material is contributed by subscribers, although any interested person may submit material for consideration. The newsletter enjoys a wide distribution with subscribers in more than 15 countries.

Contents of CPN include:

- 1) *Beginner's Corner*—articles with basic information on CP.
- 2) *Botanist's Corner*—more botanically oriented information, taxonomy, history, etc.
- 3) *News & Views*—topical notes and comments concerning any aspect of CP—usually up to 300 words.
- 4) *Short Notes*—informal and brief organized contributions by an author on one topic—usually about 300-1200 words.
- 5) *Articles*—longer, more detailed contributions in excess of 1200 words. There may also be a *Feature Article* dealing with a specific topic to which an issue may be dedicated.
- 6) *Review of Current Literature* received since last issue, including scientific and popular articles and books. Occasionally, older important literature is reviewed as it comes to light.
- 7) Updates of inventory of *Seed Bank*.
- 8) Any *Special Notices* from the editors and/or readers.

The first issue of each volume-year includes a list of CP sources, CP books and detailed information on the Seed Bank.

As a subscriber, you are encouraged to contribute material for publication to one of the four co-editors. You will see the formats of the various sections in your first issue. Subscriptions are by the volume-year only (March, June, September, December). Back copies are available by the volume-year only. Individual issues are not sold. ICPS realizes no profit; subscription fees are governed by printing, mailing and typing costs with a small excess to cover future, unforeseen increases in cost.

THE GREEN SWAMP AND ATLANTIC COAST TRIP

(Continued from September)

By Jim Miller
2319 Ninth Street
Green Bay, WI 54304

Certainly the largest proportion of pitcher plants here were *S. flava*, but *S. rubra* was quite numerous being found in large clonal colonies by the thousands. *S. purpurea* was the least common of the three but still easy to find. Surprisingly, there were almost no hybrids to be found in the areas we explored. Only two plants of *S. purpurea* x *rubra* and a dense group of small plants which appeared to be *S. flava* x *rubra* were seen. Not a single other hybrid was in evidence.

We spent that night once again in Charleston and the following day made our way back to Florida. One last stop just north of Jacksonville proved to be one of the most spectacular sights of our trip. This location was a large field behind a local farmer's house literally covered with thousands of *S. minor* in dense colonies. This field appeared to have been well fired over considering the lack of tall grasses and weeds. This in the only time I have ever seen *S. minor* growing in such profusion. The plant is typically found growing in small groups spread out over a large area. Here they were growing in thick colonies reminiscent of the Gulf Coast stands of *S. leucophylla* or *alata*. (Fig. 5 & 6)

There are a few observations I would like to make in closing based on what Bob and I saw and discussed during this trip. The *S. purpurea* native to the Carolinas are accepted as being different from the northern form and when these plants are compared side-by-side, these differences are apparent. Now if a plant of the Gulf coast form of *S. purpurea* is added, there are noticable differences here too. Most striking is the larger pink flowers of the Gulf plants compared to the smaller red flowers of the other forms. While I cannot claim to have seen all the Gulf plants in flower, the ones I have observed have all displayed a large light to dark rose pink flower (Fig. 7). In addition, the Gulf plants seem larger and with more variability in the patterns of venation.

When seen growing in the open, the Gulf forms may assume an almost purple coloration to the pitcher. The Carolina plants seem in these conditions to be rather a brighter red to maroon.

In subsequent correspondence with Don Schnell, I have since been informed that indeed larger, open pitchers similar to the Gulf form are found among plants of relict bogs in the pink flower of the Gulf plants, Don mentions that he has seen the Carolina plants often displaying pink flowers. While I am informally suggesting forma status for the pink flowered plants, I should include Don's comments: "...While some taxonomic distinction may ultimately be justified, I am not certain that we have enough systematic data at hand to justify it." Certainly Don's contributions to the serious study of Sarracenias have been tremendously important in understanding these plants and it will be interesting to see what his conclusions may be in the future regarding these pink-flowered variants.

The final point I wish to discuss are the popular misconceptions regarding *S. flava*. First of all, *S. flava* is most decidedly *not* monomorphic in the Gulf Coast. As noted in my REPORT ON THE STATUS OF GULF COAST CP POPULATIONS, at least four distinct forms can be seen in this region. The large, yellow-green / purple throat form is found in large numbers from southern Georgia to Pensacola, Florida. Comparing this plant beside a Carolina plant will show that aside from some minor environmental differences [green to yellow tube, slightly wavy lid etc.] the plants are identical. This is especially true of plants grown together in the greenhouse for at least one season. Therefore the var. *rugelii* label is invalid. Secondly, all these plants of *S. flava* are capable of producing the large [to 90 cm] pitchers when conditions are right and (Figs. p.96; text continued p. 100)

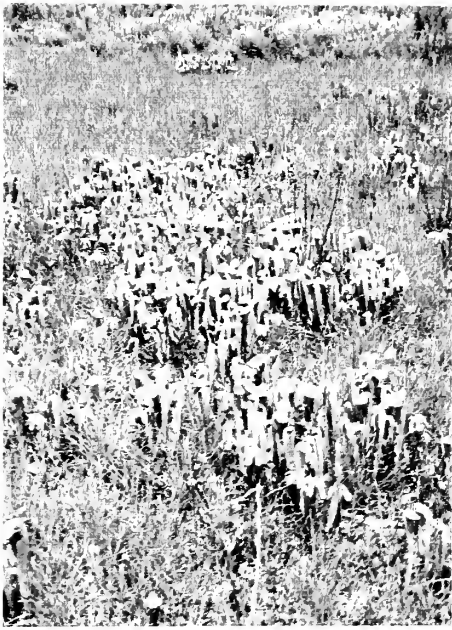


FIG. 5



FIG. 6

Extensive growth of *Sarracenia minor* in a farmer's field north of Jacksonville.

All photos by the author.



FIG. 7. The pink flowers of *Sarracenia purpurea* as seen in the field near Mobile, Alabama.

FLORIDA - continued from p. 92

mid 20's on occasion, two electric and two kerosene space heaters keep the temperature in the mid 50's. The *Sarracenia* and native *Drosera* do fine outside the year round.

Most of my propagation is done indoors using a covered 100 gal. aquarium fitted with two four foot plant lights. *Nepenthes* cuttings have half of their lower leaves removed, with two or three terminal leaves being left intact. The ends of the cuttings are dipped in Rootone F [with fungicide] and inserted into a handful of moist sphagnum, which is wired in place. The moss ball is then set atop a thin layer of vermiculite in a seed flat, placed in the aquarium, and misted frequently. When roots show through the moss [which may take three months or longer] the plants are potted up using a mixture of sphagnum, peat, and vermiculite. *Nepenthes* seed has yielded various results from good to poor, but is very slow and I would recommend cuttings to anyone wishing to try propagation.

All the mature CP are watered daily during warm sunny-weather and less during winter or periods of cloudy weather. I have had good results fertilizing *Nepenthes* once a month alternating Peters 20-20-20 Orchid Special with fish emulsion, both cut to half strength recommended for *Cattleya* orchids which would become 1 tablespoon per gallon. *Cephalotus* responds well to dilute bi-

monthly feedings of Miracid®, [$\frac{1}{4}$ teaspoon per gal], as do *Sarracenia* and several *Drosera* spp. However Miracid® has stunted growth and inhibited pitcher formation in *Nepenthes*.

Pests and problems have been few and for the most part easily handled. The worst problem was heater failure on a very cold night which burned the leaves off the lowland *Nepenthes* and cut the *Droseras* back to the soil. Pests have included thrips [which were easily controlled with a rose dust], caterpillars, and wasps which bite off developing pitchers. Much worse are the Maidenhair Ferns [*Adiantum* spp.] that pop up now and then. Their very vigorous root system is capable of choking out a weaker plant. I found this out by letting some grow in a pot with an *Anthurium*. They should be destroyed as they appear.

Lastly I would like to thank Dr. Kiat Tan of Marie Selby Gardens, Patrick Nutt of Longwood, Joe Mazrimas and CPN, anonymous friend, and all the others who have spurred my interest in one of God's most unique creations, the Carnivorous Plants.

SPECIAL ANNOUNCEMENT

NEW WALL CHART AVAILABLE. Keith West, one of the foremost botanical artists of the world, is completing a series of 16 24"x31" full color wall charts depicting composite scenes from major US botanical regions, somewhat similar to the British Museum's series for Britain. The first four are completed, and one is on Southern Pinelands, included in the paintings, four species of *Sarracenia*, two *Droseras*, one *Pinguicula* and two *Utricularias*. Included in the scene are various pinelands orchids and other associated plants familiar to those who have botanized the eastern coastal plain. This chart is No. 306C, costs \$8.00 (plus \$1.50 postage) and is available from the New York Botanical Garden Shop, Bronx, NY 10458. The plants are all very well done as is the printing.

GROWING CP - continued from p. 94

tures are during the active growing season, the more light the plants seem to take in and subsequently traps assume the healthy-looking "natural" colors.

I am currently growing, and having success with the following species: *Drosera aliciae*, *D. hamiltonii*, *D. spatulata*, *D. prolifera*, *D. capensis*, *D. binata* [all forms], *D. adelae*, *D. schüzandra*, *Cephalotus*, *Darlingtonia*, *Pinguicula caudata*, *P. x kewensis*, *P. gypsicola*, *P. ionantha* and *P. planifolia*.

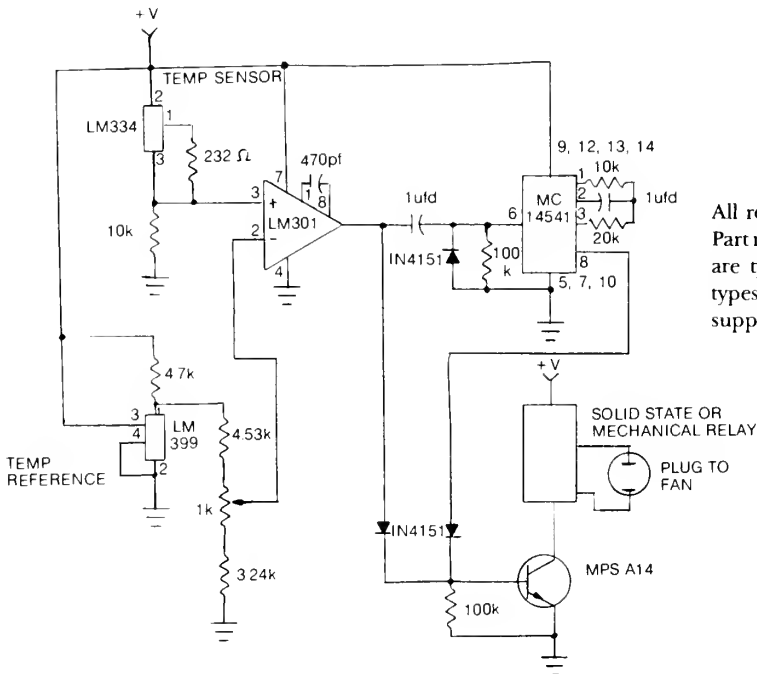
I maintain an eight to nine hour light cycle during the winter months and increase to sixteen hours during the summer.

Greenhouse plans

by Tom Story
1112 Klengel St.
Antioch, CA 94509

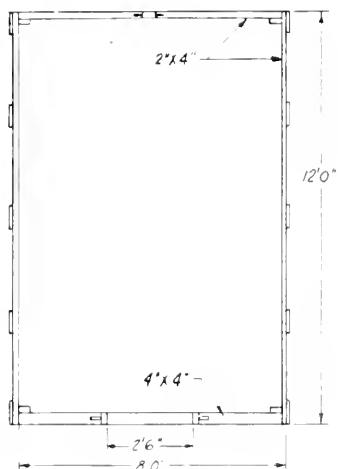
The construction of the illustrated greenhouse is very simple and fairly completely described by the drawing. [Fig. 1] The frame will conform very well to uneven or sloping ground, eliminating the necessity of initial leveling. The entire greenhouse was built from easily obtainable materials for under \$100, but most people have at least some of these materials in their scrap piles. The simplicity allows for flexibility in making changes to conform with varying requirements such as enlargement. The completed greenhouse can be covered in either polyethylene or PVC [Poly Vinyl Chloride] clear

plastic which comes in rolls, PVC being more expensive but preferred as it will last many times longer. There is also a new product designed just for this purpose which is the plastic sheet with chicken wire embedded in it for added strength. I used the standard PVC with mine and the unit is surprisingly stronger than the appearance would suggest. Our winds here at times can be quite violent but no damage has yet occurred. One final suggestion, in stapling the plastic cut squares of some stiff material about one inch square and staple through the middle to enlarge the holding area and

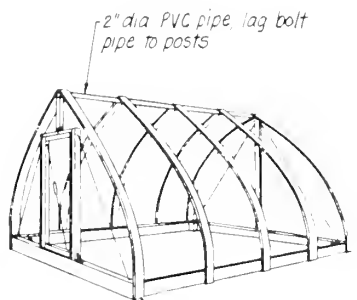
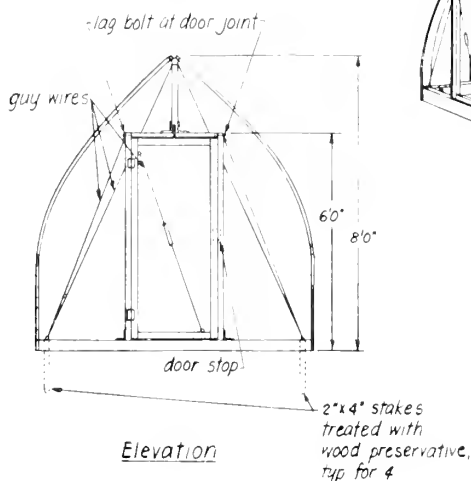


All resistors ¼ watt.
Part numbers and values
are typical; many other
types will work. Power
supply can be 10v to 15v.

AUTOMATIC FAN CONTROL



Note Cover frame with clear plastic sheeting



$\frac{1}{2}$ " x 4" x 12' redwood slats, cut to approx 10'; glue and nail at base, use 2 screws at top 10 slats req'd

Greenhouse

adapted from a plan by the U.S. Dept of Agriculture by Tom Story

drawn by E. Banuet Hutton

5-80

eliminate tearing. I used a plastic "For Sale" sign to make these.

The fan controller is fairly simple to construct for an experienced electronic technician but would be more difficult for others. The parts mentioned may be substituted for any easily obtainable part. Vent openers could also be easily added with no

modification. I adjusted my fan to turn on above 90° but it can be set to virtually any other desired temperature.

Please feel free to contact me for any additional information. I will be glad to provide assistance to anyone if they send a SASE.

Review of Recent Literature

De, D.N., S.N. Ghosh. Autoradiographic studies on the terminal heterochromatin of *Drosera burmanni*. Bull. Bot. Soc. Bengal 32 (½):41-47 1978.

The 20 minute chromosomes of this CP species have terminal segments of heterochromatin which the author shows replicate late in the cell cycle.

Dodge, Harold R. 1947. A new species of *Wyeomyia* from the pitcher plant. Proc. Ent. Soc. Wash. 49:117-122.

This paper contains Dodge's formal description of *W. haynei* which he feels best fits the southern populations inhabiting *Sarracenia purpurea* ssp. *venosa* pitchers, while the older *W. smithii* are found in populations of the northern ssp. *purpurea*. Previously, it was thought there was one species, *W. smithii*, involved. This older reference is of some interest because it eluded us so long even though we knew generally of the concept; now we have the exact reference. (See also Castanea 37:146-147, 1972; Castanea 44:47-59, 1979.)

Erber, D. An investigation of the biocenosis and the necrocenosis in pitcher plants of Sumatra. Arch. Hydrobiol. 87 (1): 37-48. 1979

Nepenthes pitcher content is influenced by the structure of the pitcher and life history of the insect species.

Heslop-Harrison, Y. and J. Heslop-Harrison, 1980. Chloride ion movement and enzyme secretion from the digestive glands of *Pinguicula*. Ann. Bot. 45:729-731.

Protein challenge studies of leaf segments of *P. ionantha* indicate that rapid movement of chloride ion from reservoir to endodermal to head cells in secretory glands causes a flush of water movement which washes stored enzymes out on to the leaf surface. (DES)

Mogi, M., J. Mokry. Distribution of *Wyeomyia smithii* eggs in pitcher plants in Newfoundland, Canada. Trop. Med. 22 (1): 1-12. 1980

Most eggs of this mosquito were laid in new pitchers of *Sarracenia purpurea* and chemical stimuli specific to new pitchers played a dominant role in selectivity. The distribution pattern of eggs suggested that a female lays eggs neither at random nor in a large batch but in small numbers. The ecology and evolution of mosquitoes breeding in small-container habitats was discussed.

GULF COAST - continued from p. 95
therefore the var. 'maxima' label should also be discouraged.

Also in the Gulf area are found a variety of light to heavily veined specimens with a great degree of variability in coloration. The once thought to be nearly extinct form with red tube and green lid may be locally common in some locations in the Gulf. Finally, a copper-lid form with large waxy lid is found in only a few locations around and near Pensacola and appears to be the rarest of the *S. flava* forms in the Gulf area based on my explorations.

WILLIAMS - continued from p. 91
trap narrowing in *Dionaea* (Droseraceae). Amer. J. Bot. 64:881-886.

Williams, S.E., 1976. Comparative sensory physiology of the Droseraceae—the evolution of a plant sensory system. Proc. Amer. Philos. Soc. 120:187-204.

Williams, S.E. and Pickard, B.G. In press. The role of action potentials in the control of capture movements of *Drosera* and *Dionaea*. In: Galston, A.W. Plant Movements. Springer Verlag. Berlin, Heidelberg, NY.

NEWS & VIEWS - continued from p. 90 didn't freeze by the winter weather and returned from the roots. The original plants were killed by the winter frost.

I found that the narrow leaf variety grows slightly larger than the wider form. I had some problems with the flowers on the wide leaf variety which want to die before they bloom. I wonder why?

Plants get rather large and scapes also get quite tall. The plants self-pollinate and the seed which looks like finely chopped human hair, germinate in about two weeks. The container to grow the plants should be about 5 inches deep (12.5 cm.) Sphagnum peat makes a good planting medium and I water with rain water. These plants don't have a dormancy requirement but its best to partially shade them in mid-summer.

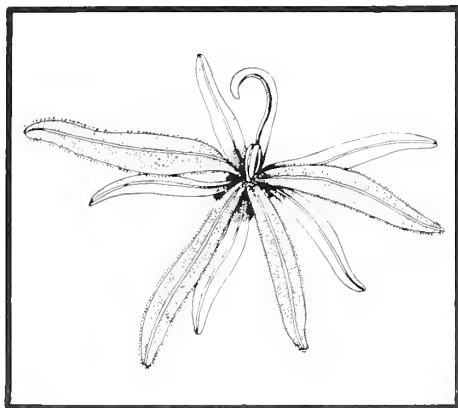
JOE MAZRIMAS reports that the San Francisco County Fair Flower Show held August 29-31 was a rousing success with many entries for the Carnivorous Plant Division. The best plant in the show was won by Geoffrey Wong for a *Nepenthes gracilis* in a terrarium. Other winners in varios classes were Chester Nave, Jeff Gold, Antonio Brito, Leo Carrillo, Joe Mazrimas, Paul & Mike Morris, Allen Ber, Larry Logoteta and Eileen Masterson. There were 47 entries in the show which were viewed by crowds of people over the three day period.

THORSTEN MOSISCH [174 Mt. Ommaney Drive, Brisbane, Jindalee, Qld. 4074, Australia] writes: I was thinking whether you would consider the following notes for publication in the next issue of CPN; I would appreciate it very much.

I am a new CPN subscriber and I think the journal is an excellent publication for all people interested in CP's, especially since every subscriber has the opportunity to contribute to it. Keep it up!

I would like to inform fellow CP enthusiasts that in the current set of the series "A Horticultural Guide to Australian Plants", set #7, August '80, three CP's are being discussed. These are: *Byblis liniflora*,

Drosera adelae and *D. glanduligera*; all reproduced in superb color photographs and shown in flower. I think there was a notice about this series in #1, Vol. 9 together with the address from where to obtain the new set, which costs \$6 (Australia) and is either available as a book or loose-leaf pages for a binder.



D. adelae. Drawing by J. Miller.

A few months ago I acquired a *S. flava* cross *S. alata*; it has developed four 30 cm high, healthy, green and at the throat red veined pitchers, but the tips of coming pitchers are seeming to bury themselves back into the soil. Has anyone observed this behaviour before and could clarify it?

I also would like to take up correspondence with any CP collectors who are interested in doing so.

T. MOSISCH also writes: The purpose for undertaking this field trip was to study the different species of *Drosera* to be found on the coastal Wallum heath country on Bribie Island, about 50 Km north of Brisbane. The area I chose was adjacent to a large pine plantation and was relatively undisturbed. The soil around here was sandy and damp (the area was formerly covered by sand dunes). Ditches, water-holes and sedgegrass dominated the landscape. It was between the latter where I discovered *D. spathulata*, deep red, in barely shaded conditions. Plenty of seedlings were thriving everywhere, some almost overgrown by Spaghnum moss.

(Please see **MORE N & V** page 102)

MORE N & V - continued from p. 101
 Only a few plants were flowering (5 petals, purple). The largest rosettes here were about 4 cm in diameter. Further on I noticed two lonely growing *D. spathulatas* near a muddy waterhole, both had rather smaller rosettes. What attracted me were their flowers: presumably two different forms, one flowered white with 6 petals and its neighbor, deep purple with 5 petals. A bit nearer to the waterhole I discovered *Utricularia violacea*(?) in very sandy, wet conditions; the scapes were about 3 cm high, all bearing small, violet flowers. Now I reached a rather drier, grassier area and was delighted to see so many *D. peltatas* thriving between the dry grasses. They, too, were colored a deep red and some reached heights of 20 cm, having up to 5 stems arising from the central rosette. Flowering seemed to just having been finished, seed capsules had been formed and the occasional, 5-petaled, white flower could still be seen, dried up and about to be lost. I also could find many specimens of *D. pygmaea*, almost all in flower, which had a light pinkish center and 4 white petals. Occasional specimens of *D. rotundifolia* were also to be found. Here I could find *D. spathulata* only in wetter areas, where at one particular instance a group of three beautiful specimens was growing near the rim of a small pool of water. Each of the rosettes measured about 7 cm in diameter. To top it all off, I discovered *Utricularia lateriflora* in a flat, sandy patch right next to that pool. There were no leaves present and some scapes bore light purple flowers.

WANT ADS

Donald Burden; Rt. 3 Box 219; Floyds Knobs; IN 47119. [ST] *Nepenthes* cuttings, *Drosera schizandra*, *Drosera regia*, tropical *Utricularia*, free *Utricularia sandersoni* for self-addressed, stamped envelope (U.S.A. members only), plants will be sent in March 1981.

Tom Massey; 3700 Sutherland #U-6; Knoxville; TN 37919. [TS] trade preferred, well rooted cuttings, pitchers up to 3"; *N* x *kosobe*, *N. gracilis*, *N. khasiana*. [WTB] rooted cutting or

plants *Nepenthes* species or hybrids; Mexican pinguiculas, *U. inflata*, *U. radia*, *Byblis gigantea*, *Sarracenia* hybrids.

C. Schon; P.O. Box 79; Encinitas; CA 92924. [TS] Plants; *Sarracenia* x *excellens*, *S. x mitchelliana*, *S. flava* var. *rugelii*, *U. prehensilis*, *D. arlingtonia californica*. [WTB] *S. oreophila*, *Sarracenia* hybrids, and Mexican *Pinguicula*, *Nepenthes* spp., large *Cephalotus*, *Byblis gigantea*, tropical and tuberous Australian *Drosera*, rarer pygmy *Drosera*, *Drosera regia*, *Drosera cistiflora*, any *Heliamphora*, *Pinguicula hirtiflora*. Seeds; *Drosophyllum*, *Byblis gigantea*, *Polypmopholyx*, *Pinguicula lusitanica*. (P.S. [TS] *Drosera nitidula*)

Sara Zart; 9548 McVicker Ave.; Oak Lawn; ILL 60453. [WTB] *Aldrovanda vesiculosa*, *Polypompholyx*, *Drosera brevifolia*, *D. stolomifera*, *D. adela*, any Mexican *Pinguicula*, *Drosera erythroziza*.

Title index

A new <i>Drosera</i> record for New England	19
Beginners' Corner— <i>Cephalotus</i>	50
Biology of West Australian	
tuberous <i>Drosera</i>	9
Cannington Swamp	63
Cannington Swamp, R.I.P.	8
Carnivorous plants do not appear	
to be cannibals	38
C.P. growing in Central Florida	92
C.P. growing the unique way—	
report from down under	71
<i>Darlingtonia</i>	39
<i>Drosera linearis</i>	16
<i>Drosera regia</i>	15
Growing C.P. under lights	94
Greenhouse plans	98
How to raise fruit flies as food for C.P.	44
How Venus's flytraps catch	
spiders and ants	65, 91
<i>Nepenthes ampullaria</i>	47
New <i>Drosera</i> from the	
top end of Australia	46
New Forest boglands	48
On the names of the Venus's flytraps	64
Photographic primer—	
color variants of <i>S. flava</i> L.	41
Pinguiculas gotta swim,	
sarracenias gotta fly	15
Publication of new CP cultivars	20
The Green Swamp and	
Atlantic Coast trip	66, 95
The 1980 RHS Chelsea Flower	
Show—May, 1980	69
The predacious fungi	40
Three Australian sundews	13

Author and photographer index

Aniowski, S. 60
 Ali, M. 89
 Beasley, R. 60
 Berger, C. Jr. 5
 Bolton, C. 31
 Burns, J. 31,32
 Carroll, B. 32,33
 Claudi-Magnussen, G. 40
 Clemens, W. 89
 Craig, D. 89
 Davis, T. 5
 Deitch, R. 5
 Dixon, K. 1, 9, 11, 23, 28
 Dodd II, C. 92
 Dress, W. 64
 Etges, W. 61
 Fleming, R. 61
 Ford, A. 5
 Frenzer, R. 33,34
 Godbout, A. 34,35
 Goddard, M. 5
 Gold, J. 6
 Grothaus, J. 89
 Hanrahan, B. 19
 Hansoti, A. 61
 Heiple, P. 61
 Helmer, J. 6
 Humble, R. 6
 Jennings, R. 90
 Kusakabe, I. 35
 Loneragan, W. 63
 Lowrie, A. 8
 Lynch, K. 39
 Mazrimas, J. 22
 Mellichamp, L. 87
 Miller, J. 6, 14, 35, 39, 66, 67, 84, 94, 95
 McComb, A. 63
 McMahon, R. 36
 Mosisch, T. 101
 Newman, G. 19
 Owens, C. 62
 Pate, J. 1, 9, 11, 23, 28
 Robinson, J. 20
 Schnell, D. 16-18, 29, 41-43, 50, 56
 Schon, C. 6
 Severin, L. 7
 Sheridan, N. 36
 Smith, S. 36, 53, 77
 Song, 3, 59
 Sowers, C. 82
 Speirs, D. 15,38, 62
 Story, T. 98
 Stoutamire, W. 13, 14, 24
 Stromberg, J. 7
 Taylor, D. 20, 48, 49, 57, 69, 70

Tsang, P. 46, 71-74
 Varez, D. Jr. 47
 Vozzo, S. 76
 Webb, P. 36
 Wiggins, R. Jr. 44
 Williams, S. 65
 Ziemer, B. 15

Genera index

Aldrovanda 15, 33
Byblis 5, 6, 8, 15, 59, 80
Cephalotus 7, 8, 15, 50, 51, 59, 79
Darlingtonia 15, 39, 39
Dionaea 15, 21, 32, 32, 39, 44, 50, 61,62,
 64, 65, 68, 72, 75, 76, 76, 77, 83,
85, 86, 90-92, 94, 104
Drosera 1, 2, 5, 10, 11, 12, 13, 14, 15-17,
 17, 18, 19, 19, 20, 22, 22, 23, 23,
24, 24, 28, 28, 33, 35-37, 46, 46,
 48, 48, 49, 57, 58, 61, 62, 67, 68,
69, 70, 71, 73, 74, 74, 75, 78, 79,
 83, 84, 90, 94, 97, 100-102
Genlisea 60
Harposporium 40
Heliamphora 5, 60
Monacrosporium 40
Nepenthes 5-7, 22, 35, 35, 36-38, 47, 49,
 50, 53, 53, 60, 61, 70, 71-73, 73,
 74, 74, 75, 80, 92, 93, 97, 100,101
Pinguicula 5, 15, 19, 21, 33, 33, 37, 49, 67,
 72, 73, 79, 80, 89, 90, 92-94, 97,
 100
Polypompholyx 8, 60
Sarracenia 5, 6, 15, 16, 19, 21, 22, 29, 30,
 31, 35, 36, 37, 41, 42, 43, 56, 57,
 58, 59, 61, 62, 66, 67, 68, 69, 70,
 72, 72, 73, 73, 78, 80, 82, 89, 90,
93, 95, 96, 100, 101
Utricularia 6, 8, 16, 19, 21, 22, 33, 34, 36,
 37, 48, 53, 62, 79, 80, 82, 89,
 102

Underline indicates illustration.

Coming in 1981

- Seeds
- *S. purpurea* variants
- The Czech Butterwort
- More Australian C.P.



Where the podium and the lever meet is a lighter colored flexible area where the hair can be bent. It is in this area that the sensory cells have recently been demonstrated to be located by R.M. Benolken and S.L.Jacobson. These initiate the electric current that triggers the impulses which sweep over the surface of the whole trap. The smaller red knobs are digestive glands which are thought to secrete the enzymes that digest the insect.

Photo by Stephen Williams